CLAIMS

WHAT IS CLAIMED IS:

1. A polypeptide comprising a chemokine fragment, wherein said chemokine fragment stimulates the differentiation of fibroblasts to myofibroblasts, and wherein said polypeptide does not comprise the full-length, wild-type chemokine.

2. The polypeptide of claim 1 wherein the chemokine fragment is a fragment of a CXC chemokine.

3. The polypeptide of claim 2 wherein the polypeptide is not angiogenic.

4. The polypeptide of claim 2 wherein the CXC chemokine fragment is an N-terminal CXC chemokine fragment.

5. The polypeptide of claim 4 wherein the N-terminal CXC chemokine fragment comprises an ELR motif.

6. The polypeptide of claim 5 wherein the CXC chemokine fragment comprises an amino acid sequence that is at least 70% identical to an N-terminal amino acid sequence of chicken chemotactic and angiogenic factor (cCAF), interleukin-8 (IL-8), or melanoma growth stimulatory activity (MGSA).

7. The polypeptide of claim 6 wherein the CXC chemokine fragment comprises an amino acid sequence that is at least 90% identical to an N-terminal amino acid sequence of chicken chemotactic and angiogenic factor (cCAF), interleukin-8 (IL-8), or melanoma growth stimulatory activity (MGSA).

8. The polypeptide of claim 7 wherein the CXC chemokine fragment comprises an amino acid sequence selected from the group consisting of SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, and SEQ ID NO:11.

9. A nucleic acid molecule encoding the polypeptide of claim 1.

10. A nucleic acid molecule encoding the polypeptide of claim 2.

11. The nucleic acid molecule of claim 10 wherein the polypeptide is not angiogenic.

12. The nucleic acid molecule of claim 10 wherein the CXC chemokine fragment is an N-terminal CXC chemokine fragment.

13. The nucleic acid molecule of claim 12 wherein the N-terminal CXC chemokine fragment comprises an ELR motif.

14. The nucleic acid molecule of claim 13 wherein the CXC chemokine fragment comprises an amino acid sequence that is at least 70% identical to an N-terminal amino acid sequence of chicken chemotactic and angiogenic factor (cCAF), interleukin-8 (IL-8), or melanoma growth stimulatory activity (MGSA).

15. The nucleic acid molecule of claim 14 wherein the CXC chemokine fragment comprises an amino acid sequence that is at least 90% identical to an N-terminal amino acid sequence of chicken chemotactic and angiogenic factor (cCAF), interleukin-8 (IL-8), or melanoma growth stimulatory activity (MGSA).

16. The nucleic acid molecule of claim 15 wherein the CXC chemokine fragment comprises an amino acid sequence selected from the group consisting of SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, and SEQ ID NO:11.

17. A vector comprising the nucleic acid molecule of claim 10.

18. A host cell comprising the vector of claim 17.

19. A composition comprising the polypeptide of claim 1 and a pharmaceutically acceptable carrier.

20. A composition comprising the polypeptide of claim 2 and a pharmaceutically acceptable carrier.

21. A composition comprising the nucleic acid molecule of claim 9 and a pharmaceutically acceptable carrier.

22. A composition comprising the nucleic acid molecule of claim 10 and a pharmaceutically acceptable carrier.

23. A composition comprising a nucleic acid molecule encoding a differentiation-inducing CXC chemokine, or a fragment thereof, wherein administration of said composition to cells comprising fibroblasts results in the expression of the differentiation-inducing CXC chemokine, or fragment thereof, in an amount sufficient to induce differentiation of fibroblasts to myofibroblasts, said composition additionally comprising a pharmaceutically acceptable carrier.

24. A method of inducing the differentiation of fibroblasts to myofibroblasts, said method comprising contacting fibroblasts with an effective amount of the polypeptide of claim 1 to induce differentiation of the fibroblasts to myofibroblasts.

25. A method of inducing the differentiation of fibroblasts to myofibroblasts, said method comprising contacting fibroblasts with an effective amount of the polypeptide of claim 2 to induce differentiation of the fibroblasts to myofibroblasts.

26. The method of claim 25 wherein said contacting comprises contacting fibroblasts with a composition comprising said polypeptide.

27. The method of claim 26 wherein the fibroblasts are *in vitro*.

28. The method of claim 26 wherein the fibroblasts are *in vivo*.

29. The method of claim 28 wherein said contacting is performed by administering the polypeptide to a subject having, or at risk for, a condition that can be ameliorated by differentiation of fibroblasts to myofibroblasts.

30. The method of claim 29 wherein the condition is characterized by a deficiency of myofibroblasts.

31. The method of claim 29 wherein the condition is a wound and wherein differentiation of fibroblasts to myofibroblasts promotes wound healing.

32. The method of claim 25 wherein the polypeptide is not angiogenic.

33. The method of claim 25 wherein the CXC chemokine fragment is an N-terminal CXC chemokine fragment.

34. The method of claim 33 wherein the N-terminal CXC chemokine fragment comprises an ELR motif.

35. The method of claim 34 wherein the CXC chemokine fragment comprises an amino acid sequence that is at least 70% identical to an N-terminal amino acid sequence of chicken chemotactic and angiogenic factor (cCAF), interleukin-8 (IL-8), or melanoma growth stimulatory activity (MGSA).

36. The method of claim 35 wherein the CXC chemokine fragment comprises an amino acid sequence that is at least 90% identical to an N-terminal amino acid sequence of chicken chemotactic and angiogenic factor (cCAF), interleukin-8 (IL-8), or melanoma growth stimulatory activity (MGSA).

37. The method of claim 36 wherein the CXC chemokine fragment comprises an amino acid sequence selected from the group consisting of SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, and SEQ ID NO:11.

38. A method of inducing the differentiation of fibroblasts to myofibroblasts, said method comprising contacting fibroblasts with an effective amount of a polypeptide comprising a CXC chemokine fragment to induce differentiation of the fibroblasts to myofibroblasts, wherein:

said polypeptide does not comprise the full-length CXC chemokine and said fragment comprises an amino acid sequence selected from the group consisting of SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, and SEQ ID NO:11; and

said contacting is performed by administering the polypeptide to a subject having, or at risk for, a condition that can be ameliorated by differentiation of fibroblasts to myofibroblasts.

39. The method of claim 25 wherein said contacting comprises administering a composition comprising a nucleic acid molecule encoding the polypeptide of claim 1 to cells comprising fibroblasts, whereby said administration results in the expression

of the polypeptide, in an amount sufficient to induce differentiation of fibroblasts to myofibroblasts.

40. The method of claim 25 wherein said contacting comprises administering a composition comprising a nucleic acid molecule encoding the polypeptide of claim 2 to cells comprising fibroblasts, whereby said administration results in the expression of the polypeptide, in an amount sufficient to induce differentiation of fibroblasts to myofibroblasts.

41. The method of claim 40 wherein the fibroblasts are *in vitro*.

42. The method of claim 40 wherein the fibroblasts are *in vivo*.

43. The method of claim 42 wherein said contacting is performed by administering the composition to a subject having, or at risk for, a condition that can be ameliorated by differentiation of fibroblasts to myofibroblasts.

44. The method of claim 43 wherein the condition is characterized by a deficiency of myofibroblasts.

45. The method of claim 43 wherein the condition is a wound and wherein differentiation of fibroblasts to myofibroblasts promotes wound healing.

46. The method of claim 45 wherein differentiation of fibroblasts to myofibroblasts accelerates wound closure.

47. The method of claim 40 wherein the polypeptide is not angiogenic.

48. The method of claim 40 wherein the CXC chemokine fragment is an N-terminal CXC chemokine fragment.

49. The method of claim 48 wherein the N-terminal CXC chemokine fragment comprises an ELR motif.

50. The method of claim 49 wherein the CXC chemokine fragment comprises an amino acid sequence that is at least 70% identical to an N-terminal amino acid

sequence of chicken chemotactic and angiogenic factor (cCAF), interleukin-8 (IL-8), or melanoma growth stimulatory activity (MGSA).

51. The method of claim 50 wherein the CXC chemokine fragment comprises an amino acid sequence that is at least 90% identical to an N-terminal amino acid sequence of chicken chemotactic and angiogenic factor (cCAF), interleukin-8 (IL-8), or melanoma growth stimulatory activity (MGSA).

52. The method of claim 51 wherein the CXC chemokine fragment comprises an amino acid sequence selected from the group consisting of SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, and SEQ ID NO:11.

53. A method of inducing the differentiation of fibroblasts to myofibroblasts, said method comprising contacting fibroblasts with an effective amount of a polypeptide comprising a CXC chemokine fragment to induce differentiation of the fibroblasts to myofibroblasts, wherein:

said polypeptide does not comprise the full-length CXC chemokine and said fragment comprises an amino acid sequence selected from the group consisting of SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, and SEQ ID NO:11; and

said contacting is performed by administering administering a composition comprising a nucleic acid molecule encoding the polypeptide to a subject having, or at risk for, a condition that can be ameliorated by differentiation of fibroblasts to myofibroblasts.

54. A method of inducing the differentiation of fibroblasts to myofibroblasts *in vitro*, said method comprising contacting fibroblasts with an effective amount of a differentiation-inducing CXC chemokine, or fragment thereof, thereby inducing the differentiation of the fibroblasts to myofibroblasts.

55. A method of inducing the differentiation of fibroblasts to myofibroblasts *in vivo*, said method comprising administering a composition comprising a nucleic acid molecule encoding a differentiation-inducing CXC chemokine, or a fragment thereof, to cells comprising fibroblasts, whereby said administration results in the expression

of the differentiation-inducing CXC chemokine, or fragment thereof, in an amount sufficient to induce differentiation of fibroblasts to myofibroblasts.

56. A method of inhibiting the differentiation of fibroblasts to myofibroblasts comprising contacting fibroblasts with an effective amount of an inhibitor of a differentiation-inducing chemokine during or prior to contact of the fibroblasts with the differentiation inducing chemokine or fragment thereof.

57. The method of claim 56 wherein the differentiation-inducing chemokine is a CXC chemokine.

58. The method of claim 57 wherein the fibroblasts are *in vitro*.

59. The method of claim 57 wherein the fibroblasts are *in vivo*.

60. The method of claim 59 wherein said contacting is performed by administering the inhibitor to a subject having, or at risk for, a condition that can be ameliorated by inhibiting the differentiation of fibroblasts to myofibroblasts.

61. The method of claim 60 wherein the condition is characterized by excess myofibroblasts.

62. The method of claim 60 wherein the condition is selected from the group consisting of keloid formation, pulmonary fibrosis, scleroderma, and cancer.

63. The method of claim 57 wherein the inhibitor is an antibody that specifically binds the CXC chemokine.

64. A method of inhibiting the differentiation of fibroblasts to myofibroblasts, said method comprising contacting fibroblasts with an effective amount of an inhibitor of a differentiation-inducing CXC chemokine to fibroblasts during or prior to contact of the fibroblasts with a differentiation-inducing CXC chemokine or fragment thereof, wherein:

the inhibitor is an antibody that specifically binds the CXC chemokine; and

said contacting is performed by administering the inhibitor to a subject having, or at risk for, a condition that can be ameliorated by inhibiting the differentiation of fibroblasts to myofibroblasts.

65. A method of screening for an agent that induces or inhibits the differentiation of fibroblasts to myofibroblasts, said method comprising:

a) contacting a cell comprising differentiation-inducing chemokine gene with a test agent;

b) detecting the level of the differentiation-inducing chemokine mRNA or protein, wherein:

an increase in the level of the mRNA or protein, as compared to said level in a cell of the same type contacted with a smaller amount of the test agent, indicates that the test agent induces differentiation of fibroblasts to myofibroblasts; and

a decrease in the level of the mRNA or protein, as compared to said level in a cell of the same type contacted with a smaller amount of the test agent, indicates that the test agent inhibits the differentiation of fibroblasts to myofibroblasts.

66. The screening method of claim 65 wherein said method additionally comprises recording any test agent that induces a difference in the level of the mRNA or protein in a database of agents that induce or inhibit differentiation of fibroblasts to myofibroblasts.

67. The screening method of claim 65 wherein said smaller amount of the test agent is no test agent.

68. The screening method of claim 65 wherein the chemokine is a CXC chemokine.

69. The screening method of claim 68 wherein said detecting comprises detecting the level of differentiation-inducing CXC chemokine mRNA.

70. The screening method of claim 68 wherein said detecting comprises detecting the level of differentiation-inducing CXC chemokine protein.

71. The screening method of claim 68 wherein said cell is *in vitro*.

72. The screening method of claim 68 wherein the differentiation-inducing CXC chemokine is chicken chemotactic and angiogenic factor (cCAF), interleukin-8 (IL-8), or melanoma growth stimulatory activity (MGSA).

73. A method of prescreening for an agent that induces or inhibits the differentiation of fibroblasts to myofibroblasts, said method comprising:

a) contacting a differentiation-inducing chemokine nucleic acid or protein with a test agent; and

b) detecting specific binding of the test agent to the nucleic acid or protein.

74. The prescreening method of claim 73 wherein said method additionally comprises recording any test agent that specifically binds to the nucleic acid or protein in a database of candidate agents that may induce or inhibit differentiation of fibroblasts to myofibroblasts.

75. The prescreening method of claim 73 wherein the chemokine is a CXC chemokine.

76. The prescreening method of claim 75 wherein said detecting comprises detecting specific binding of the test agent to CXC chemokine nucleic acid.

77. The prescreening method of claim 75 wherein said detecting comprises detecting specific binding of the test agent to CXC chemokine protein.

78. The prescreening method of claim 77 wherein said detecting comprises detecting specific binding of the test agent to a differentiation-inducing domain of the CXC chemokine protein.

79. The prescreening method of claim 75 wherein said cell is *in vitro*.

80. The prescreening method of claim 75 wherein the differentiation-inducing CXC chemokine is chicken chemotactic and angiogenic factor (cCAF), interleukin-8 (IL-8), or melanoma growth stimulatory activity (MGSA).

81. A method of prescreening for an agent that induces or inhibits the differentiation of fibroblasts to myofibroblasts, said method comprising:

a) contacting a receptor for a differentiation-inducing CXC chemokine with a test agent; and

b) detecting specific binding of the test agent to the receptor.

82. The prescreening method of claim 81 wherein said method additionally comprises recording any test agent that specifically binds to the receptor in a database of candidate agents that may induce or inhibit differentiation of fibroblasts to myofibroblasts.

83. The prescreening method of claim 81 wherein the chemokine is a CXC chemokine.

84. The prescreening method of claim 83 wherein the receptor is a CXCR1 or CXCR2 receptor.

85. The prescreening method of claim 83 wherein said cell is *in vitro*.

86. The prescreening method of claim 83 wherein the differentiation-inducing CXC chemokine is chicken chemotactic and angiogenic factor (cCAF), interleukin-8 (IL-8), or melanoma growth stimulatory activity (MGSA).